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Attorney's Docket No.: 016820.P121

Patent

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

James Montague Cleeves

Application No. 08/581,347

Filing Date: December 29, 1995

For: WAFER TEMPERATURE CONTROL APPARATUS AND METHOD

Examiner: Ryan, V.

Art Unit: 1641

NOT ENTERED

Assistant Commissioner for Patents
Washington, D.C. 20231

RESPONSE UNDER 37 C.F.R. 1.116
EXPEDITED PROCEDURE -- ART UNIT 1641

Sir:

Notwithstanding the rejections set forth in the Final Office Action of January 20, 1999, reconsideration of this application is respectfully requested. The Final Office Action maintains the rejection of the claims under 35 U.S.C. § 102(b) as being unpatentable over Cathey, Jr., U.S. Patent 5,096,536, despite recognizing that this reference fails to discuss the thermal conductivity properties of the O-ring seals placed between the substrate and the holding body of the plasma reaction chamber. Lacking such a teaching, the Final Office Action asserts that the thermal conductivity properties now recited in the present claims are "inherent" in the reference. Final Office Action at p. 4. This argument lacks substance.

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Date

"In order for a claim to be inherent in the prior art it is not sufficient that a person following the disclosure sometimes obtain the results set forth in the claim, it must invariably happen." Glaxo, Inc. v. Novopharm, Ltd., 830 F. Supp. 871, 874 (E.D. N.C. 1993), *aff'd,* 52 F.3d 1043 (Fed. Cir. 1995), *cert. denied,* 116 S. Ct. 516 (1995). In other words, the doctrine of inherency is available only when "the prior inherent event can be established as a certainty. That an event may result from a given set of circumstances is not sufficient to establish anticipation. Probabilities are not sufficient. . . . A prior inherent event cannot be established based upon speculation or where a doubt exists." Phillips Petroleum Co. v. U.S. Steel Corp., 673 F. Supp. 1278 (D. Del. 1987), *affd.,* 865 F.2d 1247 (Fed. Cir. 1989).

In the present case, the claims recite a relationship between the thermal conductivity of two different materials: namely, the heat transfer seal and a gas. This relationship is explained at p. 9, ll. 20-24, for the requirement where a substantially uniform heat transfer across the wafer is to be achieved. Although Cathey, Jr. does disclose the use of O-ring seals between a wafer and an electrode, it is now undisputed that there is no discussion or suggestion of the use of such seals having thermal conductivity properties similar to the claimed heat transferring seal. Indeed, Cathy, Jr. relies solely on the thermal conductivity properties of the gas introduced into the void between the wafer and the supporting electrode. See, e.g., Cathey, Jr. at col. 4, ll. 58-66 and col. 6, ll. 15-21. Moreover, Cathey, Jr. specifically indicates that the pressure of the cooling gas may vary between 1.0 and 10.0 Torr. Because the thermal conductivity of the cooling gas necessarily depends upon the pressure, and because Cathey, Jr. does not discuss varying the properties (e.g., thickness, material composition, etc.) of the O-ring seals, there must certainly be occasions where the thermal conductivities of these two elements are not matched so as to provide substantially uniform heat transfer across the wafer, as claimed. Thus, the elements of the present claims cannot be met for a certainty. Indeed, it is difficult to imagine how a reference that fails to discuss the thermal conductivity properties of the O-ring seals at all, could somehow

inherently suggest the use of such seals having the specific thermal conductivity properties to achieve the claimed relationship.

Even further, Cathey, Jr. discloses a system wherein the presently claimed substantially uniform heat transfer across the wafer is truly unlikely to be achieved. Consider that Cathey, Jr. intentionally introduces an area of vacuum between the substrate and the holding body, between the inner and outer O-rings. Cathey, Jr. at col. 5, ll. 19-29. The heat transfer between the substrate and the holding body over this portion of the substrate must necessarily be different than that between the portion of the substrate disposed over the cooling gas and the holding body. Accordingly, the present claims are patentable over Cathey, Jr.

Even in the prior systems noted by Cathey, Jr., this substantially uniform heat transfer across the wafer would not be found. For example, Cathey, Jr. explains that in prior system, "the wafer and the electrode are not normally perfectly flat" and, as a consequence, "high vacuum voids" are created between the wafer and the electrodes". Cathey, Jr. at col. 2, ll. 12-20. These voids would necessarily be regions in which the heat transfer from the wafrer to the electrode would be different from that at other portions of the wafer -- thus, indicating that the heat transfer is not substantially uniform across the wafer. Even where the single O-ring was used, cooling gas was observed to leak into the etch chamber (Cathey, Jr. at col. 2, ll. 52-59), thus indicating that voids must still exist and, hence, that the heat transfer would not be substantially uniform across the wafer.

The reference to Kapton™ being an insulator is not understood. The present application is not necessarily concerned with the electrical properties of Kapton™, but rather with its thermal conductivity, which makes it one appropriate material for use in accordance with the teachings of the specification. Of course, the present claims are not restricted to the use of a heat transfer ring made of Kapton™. Provided herewith are data sheets from Dupont, describing some of the electrical and physical (including thermal) properties of Kapton™ for the Examiner's reference.

The rejections under 35 U.S.C. § 112, second paragraph, are traversed. The term "substantially uniform" as used in the claims is used consistent with its customary meaning. Webster's New World Dictionary, 2d ed. defines substantially as being "in the nature of"; and uniform is defined as "not varying or changing". This is consistent with the discussion at p.7, ll. 14-16; p. 7, l. 26 - p. 8, l. 2 and p. 9, ll. 1-8 of the specification, wherein it is indicated that the heat transferring seal and cooling gas provide for uniform heat transfer across the substrate. Moreover, at p. 9, ll. 17-27, it is explained how appropriate combinations of heat transferring seals and cooling gases could be chosen to meet this requirement. Therefore, it is clear what is encompassed by this term and the rejection should be removed.

Please charge any deficiencies of fees associated with this communication to our Deposit Account No. 02-2666.

Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: 3/18, 1999

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Attorney's Docket No.: 16820.P121

Patent

In re the Application of: James Montague Cleeves
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AMENDMENT UNDER 37 C.F.R. § 1.116 EXPEDITED PROCEDURE

Application No.: 08/581,347

Filed: December 29, 1995

EXAMINING GROUP 1641

For: WAFER TEMPERATURE CONTROL APPARATUS AND METHOD
(title)

ASSISTANT COMMISSIONER FOR PATENTS
Washington, D.C. 20231
Box AF

SIR: Transmitted herewith is an **Amendment After Final Action** for the above application.

_____ Small entity status of this application under 37 C.F.R. §§ 1.9 and 1.27 has been established by a verified statement previously submitted.
_____ A verified statement to establish small entity status under 37 C.F.R. §§ 1.9 and 1.27 is enclosed.
__x__ No additional fee is required.
_____ **A Notice of Appeal is enclosed.**

The fee has been calculated as shown below:

	(Col. 1) Claims Remaining After Amd.		(Col. 2) Highest No. Previously Paid For	(Col. 3) Present Extra
Total Claims	* 20	Minus	** 20	0
Indep. Claims	* 2	Minus	*** 3	0
☐ **First Presentation of Multiple Dependent Claim(s)**				

SMALL ENTITY		OTHER THAN A SMALL ENTITY	
Rate	Additional Fee	Rate	Additional Fee
X9	$	X18	$ 0
X39	$	X78	$ 0
+130	**$**	**+260**	**$**
Total Add. Fee	$	Total Add. Fee	$ 0

* If the entry in Col. 1 is less than the entry In Col. 2, write "0" in Col. 3.

** If the "Highest No. Previously Paid For" IN THIS SPACE is less than 20, write "20" in this space.

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Name of Person Mailing Correspondence

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_____ A check in the amount of $_____ is attached for presentation of additional claim(s).
_____ Applicant(s) hereby Petition(s) for an Extension of Time of _____ month(s) pursuant to 37 C.F.R. § 1.136(a).
_____ A check for $_____ is attached for processing fees under 37 C.F.R. § 1.17.
_____ Please charge my Deposit Account No. 02-2666 the amount of $_____.
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__X__ Any additional filing fees required under 37 C.F.R. § 1.16 for presentation of extra claims.
__X__ Any extension or petition fees under 37 C.F.R. § 1.17.

Date: 3/18, 1999

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